

We claim:

1. A hydrogen storage material comprising:  
a hydrogen storage alloy having the formula  $Ti_{Q-x}Zr_xMn_{Z-y}A_y$ ,  
wherein A is one or more elements selected from the group consisting of V, Cr, Fe,  
Ni, and Al;

Q is between 0.9 and 1.1

X is between 0 and .35,

Y is between 0.3 and 1.8, and

Z is between 1.8 and 2.1.

2. The hydrogen storage material of claim 1, wherein A one or more elements selected from the group consisting of V, Cr, Fe, and Ni.
3. The hydrogen storage material of claim 1, wherein X is between 0.1 and 0.2.
4. The hydrogen storage material of claim 1, wherein X is between 0.1 and 0.15.
5. The hydrogen storage material of claim 1, wherein Y is between 0.6 and 1.2
6. The hydrogen storage material of claim 1, wherein Y is between 0.7 and 1.0.
7. The hydrogen storage material of claim 1, wherein said hydrogen storage alloy is a single phase material.

8. The hydrogen storage material of claim 7, wherein said hydrogen storage alloy exhibits a hexagonal C<sub>14</sub> Laves phase crystalline structure.

9. The hydrogen storage material of claim 1, wherein said alloy comprises Ti<sub>0.9</sub>Zr<sub>0.1</sub>Mn<sub>1.3</sub>V<sub>0.45</sub>Ni<sub>0.26</sub>.

10. The hydrogen storage material of claim 1, wherein said alloy comprises Ti<sub>0.8</sub>Zr<sub>0.2</sub>Mn<sub>1.25</sub>V<sub>0.4</sub>Cr<sub>0.3</sub>Fe<sub>0.06</sub>.

11. The hydrogen storage material of claim 1, wherein said alloy comprises Ti<sub>0.8</sub>Zr<sub>0.2</sub>Mn<sub>1.25</sub>V<sub>0.4</sub>Fe<sub>0.36</sub>.

12. The hydrogen storage material of claim 1, wherein said alloy comprises Ti<sub>0.7</sub>Zr<sub>0.3</sub>Mn<sub>1.5</sub>V<sub>0.3</sub>Ni<sub>0.17</sub>.

13. The hydrogen storage material of claim 1, wherein said alloy comprises Ti<sub>0.8</sub>Zr<sub>0.2</sub>Mn<sub>1.3</sub>V<sub>0.45</sub>Ni<sub>0.26</sub>.

14. The hydrogen storage material of claim 1, wherein said alloy comprises Ti<sub>0.95</sub>Zr<sub>0.05</sub>Mn<sub>1.3</sub>V<sub>0.45</sub>Ni<sub>0.26</sub>.

15. The hydrogen storage material of claim 1, wherein said alloy comprises Ti<sub>0.9</sub>Zr<sub>0.1</sub>Mn<sub>1.28</sub>V<sub>0.3</sub>Cr<sub>0.25</sub>Ni<sub>0.17</sub>.

C O N S I D E R A T I O N S

16. The hydrogen storage material of claim 1, wherein said alloy comprises  $Ti_{0.8}Zr_{0.2}Mn_{1.31}V_{0.25}Cr_{0.3}Ni_{0.14}$ .
17. The hydrogen storage material of claim 1, wherein said alloy comprises  $Ti_{0.9}Zr_{0.1}Mn_{0.6}V_{0.2}Cr_{1.08}Ni_{0.12}$ .
18. The hydrogen storage material of claim 1, wherein said alloy comprises  $Ti_{0.8}Zr_{0.2}Mn_{1.31}V_{0.25}Cr_{0.30}Fe_{0.14}$ .
19. The hydrogen storage material of claim 1, wherein said alloy comprises  $Ti_{0.84}Zr_{0.15}Mn_{1.28}V_{0.25}Cr_{0.18}Fe_{0.25}Al_{0.06}$ .
20. The hydrogen storage material of claim 1, wherein said alloy comprises  $Ti_{0.85}Zr_{0.15}Mn_{1.5}V_{0.3}Fe_{0.23}Al_{0.06}$ .
21. The hydrogen storage material of claim 1, wherein said alloy comprises  $Ti_{0.87}Zr_{0.13}Mn_{1.29}V_{0.17}Cr_{0.18}Fe_{0.24}Al_{0.06}$ .
22. The hydrogen storage material of claim 1, wherein said alloy comprises  $Ti_{0.87}Zr_{0.13}Mn_{1.23}V_{0.16}Cr_{0.17}Fe_{0.23}Al_{0.06}$ .
23. The hydrogen storage material of claim 1, wherein said hydrogen storage alloy is in powder form.

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24. The hydrogen storage material of claim 23, wherein said hydrogen storage alloy powder is physically bonded to a support means.
25. The hydrogen storage material of claim 24, wherein hydrogen storage alloy powder is physically bonded to said support means by compaction and/or sintering.
26. The hydrogen storage material of claim 24, wherein said support means comprises at least one selected from the group consisting of mesh, grid, matte, foil, foam and plate.
27. The hydrogen storage material of claim 24, wherein said support means is formed from a metal.
28. The hydrogen storage material of claim 27, wherein said support means is formed from one or more metals selected from the group consisting of Ni, Al, Cu, Fe and mixtures or alloys thereof.
29. The hydrogen storage material of claim 24, wherein said storage material comprises said hydrogen storage alloy powder physically bonded to said support means and spirally wound into a coil.
30. The hydrogen storage material of claim 24, wherein said storage material comprises said hydrogen storage alloy powder physically bonded to said support means, a plurality of which are stacked as disks or plates.